

CLAIMS

1. (Amended) A silicon carbide porous body comprising silicon carbide particles which are aggregates and metallic silicon which is a bonding material, bonded together in such a manner that pores are retained between the silicon carbide particles and/or between the silicon carbide particle and metallic silicon,

characterized in that an amorphous oxide phase containing oxides of silicon, aluminum, and strontium ($\text{SrO}:\text{Al}_2\text{O}_3:\text{SiO}_2$) in a ratio of (1.0:0.1:1.0) to (1.0:1.0:3.0) in terms of amount ratio (molar ratio) of each substance is buried in at least some of fine pore portions having a minimum distance of 10 μm or less between the surfaces of the silicon carbide particles or between the surfaces of the silicon carbide particle and metallic silicon among the pores, and

a ratio of a total volume (pore volume of the fine pore portion) of portions in which the oxide phase is not buried among the fine pore portions is 20% or less with respect to a total volume (total pore volume) of portions in which the oxide phase is not buried among the pores including the fine pore portions.

2. (Cancelled) .

3. (Amended) The silicon carbide porous body according to claim 1, wherein a plane image obtained by photographing a cut face of the silicon carbide porous body cut with a predetermined plane is subjected to an image analysis process, and divided into a specified pore portion originating from the portion in which the oxide phase is

not buried in the pore including the fine pore portion, a specified silicon carbide particle portion originating from the silicon carbide particle, a specified metallic silicon portion originating from metallic silicon, and a specified oxide phase portion originating from the oxide phase, and a relation of the following equation (1) is satisfied by a total length (contact length) L (mm/mm²) per unit area (1 mm²) of a portion with which the silicon carbide particle portion, the metallic silicon portion, and the oxide phase portion are brought into contact on the divided plane image, and a porosity ε (%) of the silicon carbide porous body:

$$L \geq -1.0\varepsilon + 90 \dots (1).$$

4. (Amended) The silicon carbide porous body according to claim 1 or 3, wherein a ratio of a total area of portions with which the silicon carbide particle and the oxide phase are brought into contact is in a range of 10 to 70% with respect to a total area of portions with which the silicon carbide particle, metallic silicon, and oxide phase are brought into contact.

5. The silicon carbide porous body according to claim 4, wherein the ratio of the total area of the portions with which the silicon carbide particle and the oxide phase are brought into contact is in a range of 25 to 50% with respect to the total area of the portions with which the silicon carbide particle, metallic silicon, and oxide phase are brought into contact.

6. (Cancelled)

7. (Amended) The silicon carbide porous body according to claim 1, wherein melting temperatures of the oxides (SrO , Al_2O_3 , SiO_2) are in a range of 1000 to 1400°C.

8. (Amended) The silicon carbide porous body according to claim 7, wherein melting viscosity of the oxide phase is lower than that of metallic silicon.

9. (Amended) The silicon carbide porous body according to claim 7 or 8, wherein a ratio of mass of the oxide phase is in a range of 1.0 to 10.0 mass% with respect to a total mass of the silicon carbide particle and metallic silicon.

10. The silicon carbide porous body according to claim 9, wherein a ratio of mass of the oxide phase is in a range of 4.0 to 8.0 mass% with respect to a total mass of the silicon carbide particle and metallic silicon.

11. (Amended) A honeycomb structure comprising: the silicon carbide porous body according to any one of claims 1, 3 to 5, and 7 to 10.

12. (Amended) A process for producing a silicon carbide porous body, characterized by: adding, to silicon carbide particles and metallic silicon, compound containing

strontium, aluminum, and silicon in a range of 1.0 to 10.0 parts by mass in terms of oxides (SrO , Al_2O_3 , SiO_2) with respect to a total of 100 parts by mass of the silicon carbide particles and metallic silicon by adjusting a type and/or an adding amount of the compound containing strontium, aluminum, and silicon in such a manner that a content ratio ($\text{SrO}:\text{Al}_2\text{O}_3:\text{SiO}_2$) of the oxides of strontium, aluminum, and silicon being contained in an amorphous oxide phase constituting at least a part of the porous body having the porous structure obtained by the firing is in a range of (1.0:0.1:1.0) to (1.0:1.0:3.0) in each substance amount ratio (molar ratio) to obtain a raw material; forming the obtained raw material into a predetermined shape to obtain a formed article; degreasing and thereafter firing the obtained formed article; and burying an amorphous oxide phase containing the respective oxides of silicon, aluminum, and strontium in at least some of fine pore portion having a minimum distance of 10 μm or less between the surfaces of the respective silicon carbide particles or between the surfaces of the silicon carbide particle and metallic silicon among the pores formed between the silicon carbide particles in such a manner that a ratio of a total volume (pore volume of the fine pore portion) of portions in which the oxide phase is not buried among the fine pore portions is 20% or less with respect to a total volume (total pore volume) of portions in which the oxide phase is not buried among the pores including the fine pore portions to obtain the porous body having a porous structure.

13. (Cancelled)

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14. (Amended) The process for producing the silicon carbide porous body according to claim 12, wherein an amount of the compound to be added to the silicon carbide particles and metallic silicon and containing strontium, aluminum, and silicon, converted into the respective oxides (SrO , Al_2O_3 , SiO_2), is set to a range of 4.0 to 8.0 parts by mass with respect to a total amount of 100 parts by mass of the silicon carbide particles and metallic silicon.

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